Matrix News

Origin of the matrix, the Matrix, The Matrix, TIC, MIDS, and Matrix News

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In 1984, enough grad students asked me how to get to BITNET, JANET, and elsewhere from the University of Texas that I wrote up a ten page paper about it, drawing on information from the old HUMAN-NETS mailing list and other sources. I posted it to several mailing lists and USENET newsgroups, using the UT connections to the Internet, UUCP, and USENET. It was popular among computer hackers, hardcore net fiends, and graduate students in isolated places. The Internet was bigger than the old

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ARPANET, and there were more networks than there had been when I first used the ARPANET around 1975, but the kinds of users hadn't really changed much.

A computer science journal editor asked me to expand and update the paper. After three months of interviewing people in Europe and much electronic and paper correspondence, forty pages of "Notable Computer Networks" (NCN) appeared in the October 1986 Communications of the ACM. At the time, it seemed clear that there were perhaps a few hundred people worldwide actively involved in network research and engineering, and maybe a few thousand seriously interested in networking. CSNET existed, and something called NSFNET was being proposed, but networks were still something that people who liked computers used.

Meanwhile, Smoot Carl-Mitchell and I had been involved in setting up the campus network at UT, and in other networking projects. In 1986 we and some others formed Texas Internet Consulting, which does UNIX systems programming, networking, and standards. Also tutorials, articles, and books. Examples include RFC 1027 (about a proxy ARP implementation for 4.3BSD) by jsq and Smoot, "Internetting a Sun" in Sun Expert, by Smoot, and the book *The Design and Implementation of the 4.3BSD UNIX Operating System*, which I helped write.

A book related to NCN seemed like a good idea. Several people advised me to get it out as quickly as possible, because all the diverse networks were going to coalesce into one (no doubt OSI) network within a couple of years, and there would be nothing to write about. The book (*The Matrix*, 719 pages) appeared three years later (September 1989, after a couple more trips to Europe to visit places like Berlin and Dublin I'd missed before). Soon after, I gave the first tutorial derived from it, in Malaysia. It was also known as the book that introduced JUNET to the world, and eventually (November 1990) I went to Japan to speak there, too. Networks were spreading not only geographically, but also into new disciplines.

The name of the book was taken from the term, the matrix (note lower case) used by William Gibson in his science fiction novels, most notably *Neuromancer*. His matrix is a worldwide network with billions of people participating through a graphical in-

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In This Issue

People have often asked us the origins of this newsletter, as well as the term the Matrix. John Quarterman explains where we came from.

John Quarterman reviews one of several user guides to the Internet. While having some technical inaccuracies, this guide is a useful resource to the ever expanding Internet.

Brewster Kahle of Thinking Machines, Inc gives an insightful view of the role libraries can play as Electronic Publishing moves out of its infancy.

Brewster Kahle gives an overview of the Wide Area Information Servers (WAIS) which he is spearheading.

Norman Kurland gives a quick review of a new newsletter published by Meckler & Associates about research and education networks.

know when you read this paragraph that the book cites my own article on those subjects.) Good examples (mostly not from my article). There's no discussion of mailing list etiquette, conventions, capabilities, or limitations. There are lots of topics where etiquette and ethics could be discussed, but aren't.

A brief characterization of USENET newsreaders, from readnews to trn and nn, would be useful. There is an extensive list, but nothing to indicate which does what. Mailing lists appear to be equated with LISTSERV lists. There's no mention of Internet mailing lists. This leads to the misconception that the LISTSERV way is the only way.

Listings

The biggest value of the book is the listings of information resources. This is similar in style to the *Internet Resource Guide*, but goes farther afield. It also gives many useful pointers on how to get information that is not in the book.

Index

The index is serviceable, though short. I would have liked to see network acronyms expanded, in addition to the organizational acronyms.

Access

By anonymous FTP from ftphost.nwnet.net in directory nic/nwnet/user-guide start with the file README.nusirg. There's a PostScript and a plain text version of each chapter, and two compressed tar archives of the whole book: one of the PostScript chapters, the other of plain text.

Paperbound hardcopies are $20 from:

NorthWestNet
nusirg-orders@nwnet.net
+1-206-562-3000
fax: +1-206-562-4822
NUSIRG Orders
5400 SE 30th Place, Suite 202
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Electronic Publishing and Public Libraries
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When written material is distributed over wires, the difference between a public library and a bookstore becomes fuzzy, raising difficult problems for the venerable tradition of free access to information in the public library system.

Public libraries have served two clashing goals, to allow open access to published information and to archive written history for future scholars and posterity. This uneasy combination has been joined into a single institution —public libraries, both centralized and branch— due to the technology of distribution of information, paper. Books and magazines are both inexpensive and difficult to reproduce which encourages the wealthy to buy their own copy, if available, tends to protect publishers from the free use of libraries from seriously decreasing their sales. The archiving goal is not catastrophically sacrificed by risking loaning out books since the limited public use does not destroy the books. As electronic distribution (so called, electronic publishing) becomes common for different segments of written material, access and archiving become quite different, since making a copy is easy and inexpensive, and delivering a copy can be done without requiring a person to come into the library.

The result of this technology change can be an exciting one where the public library system can refine its charter and serve the public in a widespread way that was not possible with paper. The unique aspects of libraries —service oriented staff, lack of profit motive, prevalent locations, and the role in schools— can give them a more important role in the future than they ever had in the paper era. This essay will suggest a new model for the access goal of the public library, the Reading Room, that protects and promotes publishers, while serving the public in the tradition of the branch library.

Briefly, a "Reading Room" would offer patrons convenient access all published in-

formation in printed form or for screen display in many places in a town with the help of librarians, but I think the best way to explain the idea is to use the analogy with the American banking system transition from bank buildings to automatic teller machines.

Reading rooms can become an active part of people's lives much as ATM's have transformed people's relationships with banks.

A minimal design for a Reading Room would be a one room store-front that had a few comfortable chairs, a bookshelf with current fiction, several computers for browsing and reading, a printer and binder for printing copies for people, and a librarian during regular hours. Interlibrary loan would be used when a particular volume is needed. Therefore, these Reading Rooms would be used by the vast majority of the population, while the central libraries would be dominantly used by specialist and archivists. The rest of this essay will outline how this might work.

Public libraries have served two clashing goals, to allow open access to published information and to archive written history for future scholars and posterity

Patrons seem quite willing to use newer technology if it offers a savings of time or other benefits. The widespread preference for online card catalogs has been shown by the large scale conversion from physical cards despite the costs. Furthermore, good card catalogs that are accessible remotely have become very popular, such as the University of California's Melvyl system that gets 1/3 of its requests from people not in the library and often from around the globe [Lynch 91]. Therefore, by allowing people access to card catalogs in reading rooms can expand the collections that can be accessed, and be easier to use. Furthermore, these catalogs can be used from people's homes by dialing up with personal computers or through kiosks in public places.

Catalogs, however, do not replace the stacks for browsing. Computers have been making gains in browsing and serendipity as the screens get bigger and sharper, as full text becomes available, and as better searching systems are developed. Bellcorp found that serendipitous learning of journal information was enhanced by using a computer over paper [Egan 89]. Experiments in Japan using computers to replicate the experience of looking at bookshelves has had encouraging results [Sato 90]. We still have a ways to go to improve browsing, but great strides are being made.

When a patron has selected a book or paper to take out of the library, printing and binding can be done on demand. Current screen technology can be used effectively to find documents that are useful by allowing the patron to browse and read snippets, but a printer will still be prefered for reading long pieces. Although this may seem wasteful, I suggest it is not at all, for if paper were printed only if it were to be read by someone, then there would be many forests left standing, but as it is, many pages of books, magazines, and newspapers are never even read once. Trimming our waste of paper is very important and can be accomplished by encouraging people to just print what they intended to read by previewing on screens, and by printing pieces of long documents such as chapters. As screens improve, then more reading will be comfortable without resorting to paper.

What about the economic issues of royalties? Since the Reading Room monitors all the books printed and viewed, it is easy to keep a record of this and reimburse the publishers. Bear in mind, that the current copyright laws are intended to ensure that authors, editors, and publishers get a fair stake from the use of their work. Reading Rooms can easily help in this process. In fact, Reading Rooms help a publisher greatly since it handles the distribution and retail handling and the printing of the works, so the publishers can lower their costs of putting out a new volume. This cost savings can cause a flourishing of works that would have a more specialized audience.

How about covering the costs of the library? The total cost of a public library are about $3-7 per book per year, if all the books in the library are totalled and divided by the total costs. Conservatively, public libraries cost a suburban family about $60 per year. Thus, if we were to give each family in a community a debit card worth with $60 worth that can be used in any Reading Room, then every person would have every incentive to use that card to read, check out, and enjoy their library. If someone needed another card, then this can be awarded based on the librarians assessment of how the last one was used. Since not all families would use their full amount each year, this would guarantee that costs could be contained.

A Reading Room could be very inexpensive to build and operate assuming a generally thrifty approach. Two computers, a laser printer, comfortable chairs, and bookshelves could be $25k in investment, a well paid librarian would be another $50k per year, $4k for rent, leading to well under a $100k outlay every year. Since many medium city libraries have a $3-7 million dollar budget, this money could lead to 30 to 70 Reading Rooms distributed in communities for the same costs. This is not to say that this is an exact financial statement, but rather an estimate showing that this is feasible.

Might it happen? I don't know. Reassessing our basic institutions in the light of new technology is not something governments do very well. However, there are many creative people working on the problems of decreasing literacy and falling school performance. Since Reading Rooms make quality information more available to more people, this might help spur learning and exploring among our citizens; thus catching hold of this wave. I believe it is worth further study and possibly a few tests.

References:

[Egan 89] "Formative Design-Evaluation of SuperBook," D.E. Egan, J.R. Remde, L.M. Gomez, T.K.Landauer, J. Eberhardt, and C.C. Lochbaum, ACM Transactions on Office Information Systems, January 1989.

[Sato 90] "Experiences on S-system," Sato, Mamoru, Symbolics Lisp User's Group Conference 1990. Telematique International Research Laboratories.

[Lynch 91] Private conversation with Clifford Lynch of the University of California. ▦

Old Banks	Automatic Teller Machines
Centrally located	Everywhere
Limited hours	Available all the time
Local information	Global information
Physical savings books	Access cards
Used rarely	Constantly used
Libraries	Reading Rooms
Centrally located	Everywhere
Limited hours	Available all the time
Local information	Global information
Physical library cards	Access cards
—but still similar—	
Friendly librarians	Friendly librarians
Comfortable reading chairs	Comfortable reading chairs
Current fiction	Current fiction
Easy browsing	Easy browsing